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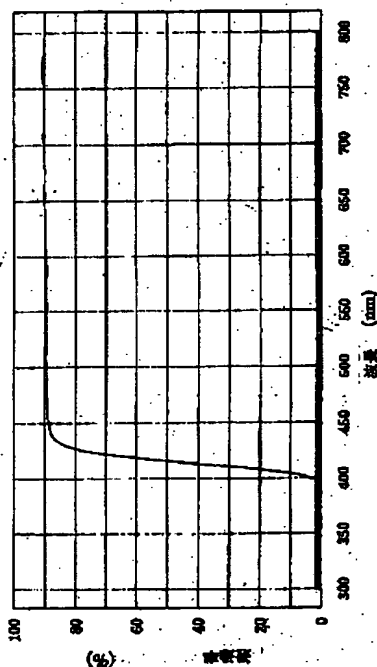
Epitome

(57) [Abstract]

[Technical problem] The plastic lens which controls transparency of ultraviolet rays effectively is obtained securing transparency of a visible ray highly.

[Means for Solution] The plastic lens containing an ultraviolet ray absorbent the wavelength of 300nm or more and whose average light transmission of 400nm or less region are 0.5% or less.

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CLAIMS

[Claim(s)]

[Claim 1] The plastic lens containing an ultraviolet ray absorbent the wavelength of 300nm or more and whose average light transmission of 400nm or less region are 0.5% or less.

[Claim 2] The plastic lens according to claim 1 whose refractive index (etae) of a plastic lens is 1.58 or more.

[Claim 3] The plastic lens according to claim 1 whose ultraviolet ray absorbent is a benzotriazol system compound.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a useful plastic lens, when protecting an eye from the harmful ultraviolet rays included in sunrays.

[0002]

[Description of the Prior Art] The ultraviolet rays which have the wavelength of 400nm or less contained in sunrays have a bad influence on a cornea or a lens. When an eye is exposed to sunrays in locations with many amounts of ultraviolet rays, such as the outdoors especially the sea, and a crest, they are a lifting and a cone about keratitis. Moreover, accumulative [of ultraviolet rays] may cause a cataract as effect on a lens.

[0003] On the other hand, as what prevents the dazzle of sunlight, since visible-ray permeability is low, a pupil opens and it is easy to be unable to prevent said ultraviolet rays, but to carry out incidence of the ultraviolet rays to an eye with the usual sunglasses, although pressure of business of the sunglasses is carried out.

[0004] Although the ultraviolet rays which have the wavelength near 200-380nm could be controlled, the lens of control of ultraviolet rays indicated by JP,60-51706,A was inadequate, when the ultraviolet rays which have the wavelength near 380-400nm could not be controlled but having been seen in 300-400nm region.

[0005]

[Problem(s) to be Solved by the Invention] This invention aims at offering an effective plastic lens, when controlling effectively transparency of ultraviolet rays 400nm or less and protecting an eye, canceling the above-mentioned technical problem and securing visible-ray permeability.

[0006]

[Means for Solving the Problem] This invention has the following configuration in order to attain

the above-mentioned purpose.

[0007] "The plastic lens containing an ultraviolet ray absorbent the wavelength of 300nm or more and whose average light transmission of 400nm or less region are 0.5% or less."

[0008]

[Embodiment of the Invention] As this invention ultraviolet ray absorbent, the various compounds which absorb ultraviolet rays with a wavelength of 400nm or less can be used. Although a benzophenone system compound, a benzotriazol system compound, a phenyl-salicylate system compound, a triazine system compound, a nickel salt compound, a nickel complex salt system compound, etc. are mentioned as a typical ultraviolet ray absorbent, a benzotriazol system compound is preferably used in respect of compatibility with resin.

[0009] As a benzotriazol system compound, 2 (2'-hydroxy-5'-methylphenyl) benzotriazol, 2 (2'-hydroxy-3', 5'-JITA challs buthylphenyl) benzotriazol, 2 (2'-hydroxy - 3', - TASHA reeve chill phenyl) benzotriazol, 2(2'-hydroxy-3' and - TASHA reeve chill -5'-methylphenyl)-5'-chlorobenzo triazole, etc. are used preferably. said ultraviolet ray absorbent is independent -- or it is not restricted especially even if it compounds and uses.

[0010] When making a lens contain said ultraviolet ray absorbent, although the amount of the ultraviolet ray absorbent used differs for every class of ultraviolet ray absorbent, it is usually 0.10 - 0.60wt% of the whole lens. It is 0.20 - 0.35wt% preferably. In respect of compatibility with the below-mentioned acrylic urethane system resin, a benzotriazol system compound is the most desirable.

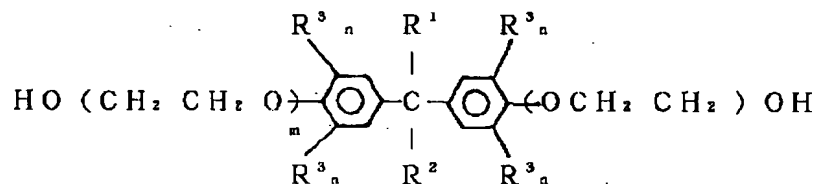
[0011] That it will be easy to color if there is much amount of the ultraviolet ray absorbent used (mainly yellow), if conversely few, transparency of ultraviolet rays cannot be controlled effectively.

[0012] Although it will not be restricted especially if total light transmission is the polymer which it can be high and can be fabricated as resin for base materials of a plastic lens, they are the low refractive-index polymer (etad = about 1.50) of a diethylene-glycol screw (allyl carbonate) system, and a bisphenol screw (polymers, such as an inside refractive-index polymer (etad = about 1.55) of allyl carbonate, benzyl methacrylate, etc., a polycarbonate, a thio urethane system (a thiol and reactant of isocyanate), an acrylic urethane system, and a styrene system, are mentioned.) as a typical thing. Especially in this invention, it is effective in the plastic lens which consists of resin which contains the following mixture (at least one sort of compounds or mixture chosen from the compound of Formula I, the compound of Formula II, and the compound of Formula III) of an acrylic urethane system as an indispensable component.

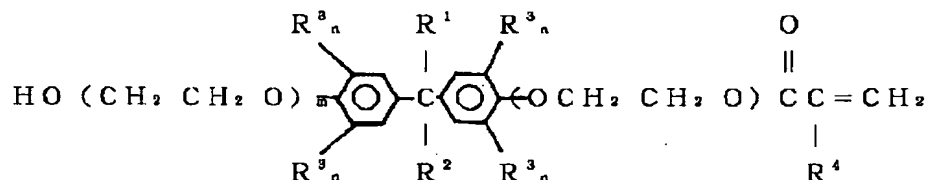
[0013]

[Formula 1]

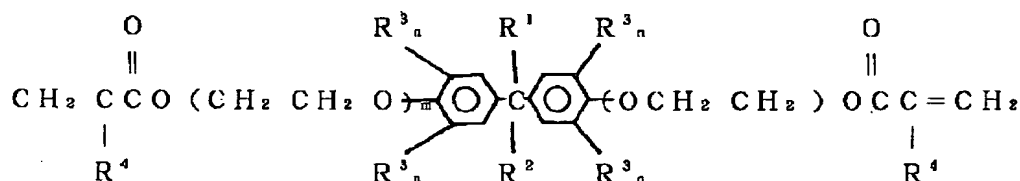
式 I



式 II



式 III



The inside R1 of a formula, R2, and R4 The alkyl group of carbon numbers 1-12 or an allyl group, and R3 The alkyl group of carbon numbers 1-12, an aralkyl radical, an allyl group, and l, m and n show the integer of 1-4.

[0014] Since the lens of this invention is a product made from plastics, it is lightweight as compared with a glass lens, and its safety is [that it is hard to be divided] high. Therefore, it can be suitably used as sunglasses or a glass lens for correction.

[0015] The plastic lens of this invention adds said ultraviolet ray absorbent to a raw material monomer, and it is made it to carry out a polymerization by the cast method etc., or it can be manufactured by distributing an ultraviolet ray absorbent in a base material by the immersion after a polymerization etc.

[0016] In case the plastic lens of this invention is manufactured, various additives, for example, a color, a deodorant, an antioxidant, a stabilizer, a polymerization initiator, an internal release agent, etc. may be added. As polymerization temperature and time amount, it is desirable to be suitably chosen in ordinary temperature -130 degree C, 10 - 50 hours, and about 20 more hours.

[0017] In order to raise the surface hardness of the plastic lens of this invention, it is also desirable to make a strengthening coat a lens front face. Furthermore, surface treatment, such as an antifog coat, acid-resisting processing, chemical-resistant processing, and antistatic treatment, or processing may be carried out.

[0018]

[Example] Although the following examples explain this invention concretely, this invention is not limited to the following examples.

[0019] 25 % of the weight of 25 % of the weight [of 50 % of the weight / of mono-methacrylate

of the piece end of mixture which contains 200 ppm of 4-methoxyphenol as one to example 3 polymerization inhibitor, [2 / i.e., /, and 2-screw (4-hydroxy - 3, 5-dibromo phenyl) propane /, 2, and 2-screw (4-hydroxy - 3, 5-dibromo phenyl) propanes], 2, and 2-screw (4-hydroxy - 3, 5-dibromo phenyl) propane dimethacrylate was dissolved in the commercial divinylbenzene. Furthermore, after adding 100 ppm of JIRAURIN acid G n-butyl tin, hexamethylene di-isocyanate was added and the urethane reaction was performed over 6 hours at 45 degrees C. After checking that the isocyanate radical did not remain with the infrared absorption spectral method, the tinuvin-P(Ciba-Geigy make) 0.010 weight section and the tinuvin-326 (Ciba-Geigy make) 0.015 weight section were added and stirred as a polymerization initiator as the par butyl-E (Nippon Oil & Fats make) 0.035 weight section, the par butyl-355 (Nippon Oil & Fats make) 0.035 weight section, and an ultraviolet ray absorbent. The circular glass curvature plate (radius of curvature of 110mm) with a diameter of 8cm was made to counter in 2mm gap, and the seal of the perimeter was carried out with the gasket made of synthetic rubber, and the circular glass curvature plate was fixed with a clip from the upper and lower sides, and it considered as shaping mold.

[0020] Filter filtration of the above-mentioned urethane-ized reaction termination liquid containing a polymerization initiator and an ultraviolet ray absorbent was carried out (super made from the Japanese pole dirty II), shaping mold was filled up, and from a room temperature to 76 degrees C, it applied from 76 degrees C to 120 degrees C at 76 degrees C for 7 hours, applied [for 2 hours] from 120 degrees C to 100 degrees C at 120 degrees C for 1 hour for 3 hours for 5 hours, and the polymerization of the plastic lens with a thickness of 2mm was carried out.

[0021] About the plastic lens after mold release, the needle penetration depth (it applies to JIS K7206) in 110 degrees C by the BIKYATTO softening temperature testing machine was measured from mold. A test condition and a result are shown in Table 1.

[0022] Except that use and an addition were below the 0.2 weight sections independently about one to example of comparison 2 ultraviolet ray absorbent, the plastic lens was obtained like examples 1 and 2.

[0023] A test condition and a result are shown in Table 1.

[0024]

[Table 1]

表 1

条件及び結果	実施例 1	実施例 2	実施例 3	比較例 1	比較例 2
混合物 A (重量部)	49.5	58.5	76.5	49.5	58.5
ヘキサメチレン ジイソシアネート (重量部)	5.5	6.5	8.5	5.5	6.5
ジビニルベンゼン (重量部)	45.0	35.0	15.0	45.0	68.6
チヌピン P (重量部)	0.10	0.10	0.20	0.10	0
チヌピン 326 (重量部)	0.15	0.15	0.10	0	0.10
屈折率 (n_d)	1.60	1.61	1.62	1.60	1.61
アッベ数 (V_d)	32	31	30	32	31
VICAT 針侵入量 (at 110 °C, mm)	0.02	0.02	0.02	0.02	0.02

It replaced with the hexamethylene di-isocyanate of examples 4-6, example of comparison 3 examples 1-3, and the examples 1-2 of a comparison, replaced with the divinylbenzene further using xylylene di-isocyanate, and the plastic lens was obtained like examples 1-3 and the example 1 of a comparison except using a divinylbenzene and styrene together.

[0025] A test condition and a result are shown in Table 2.

[0026]

[Table 2]

表 2

条件及び結果	実施例 4	実施例 5	実施例 6	比較例 3
混合物 A (重量部)	54.7	54.7	50.0	54.7
キシリデン ジイソシアネート (重量部)	7.0	7.0	6.4	7.0
ステレン (重量部)	23.6	33.2	33.2	33.2
ジビニルベンゼン (重量部)	14.4	4.8	10.1	4.8
ナフピン P (重量部)	0.10	0.20	0.15	0.20
ナフピン 326 (重量部)	0.20	0.15	0.15	0
屈折率 (n _d)	1.61	1.61	1.61	1.61
アッベ数 (V _d)	32	32	32	32

[0027]

[Effect of the Invention] The plastic lens of this invention controls transparency of ultraviolet rays harmful to human being's eye, and penetrates a visible ray with high permeability. Therefore, it is rare to receive a burden and damage in an eye, and a bright field of view is acquired.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the transparency spectrum of the lens obtained in the example 5.

[Drawing 2] It is drawing showing the transparency spectrum of the lens obtained in the example 3 of a comparison.

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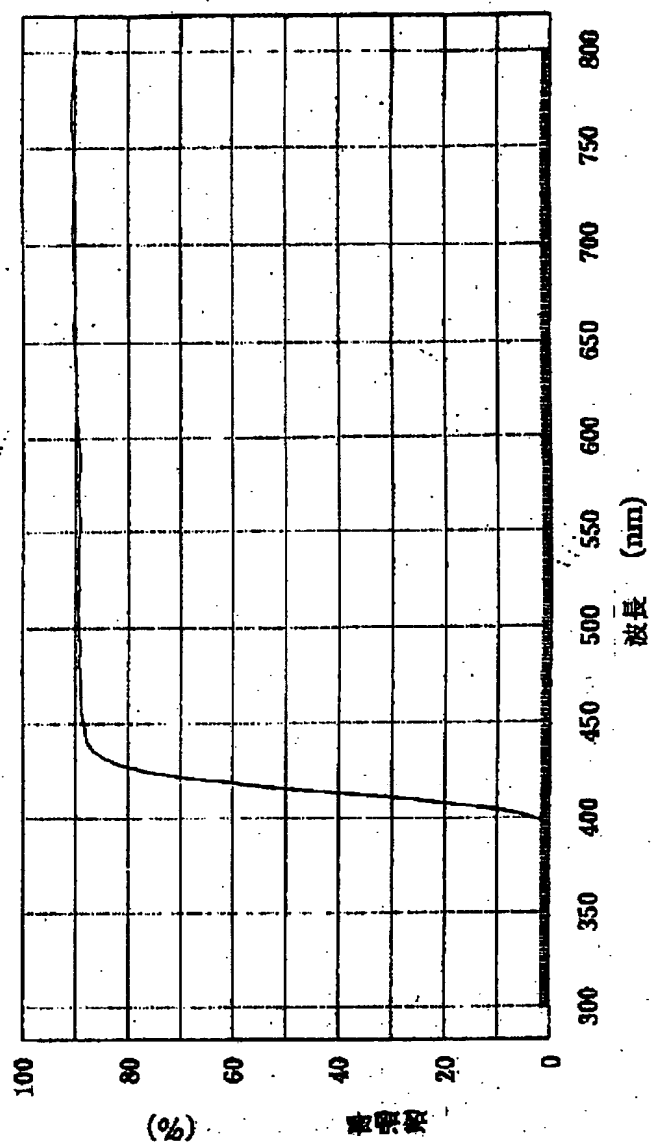
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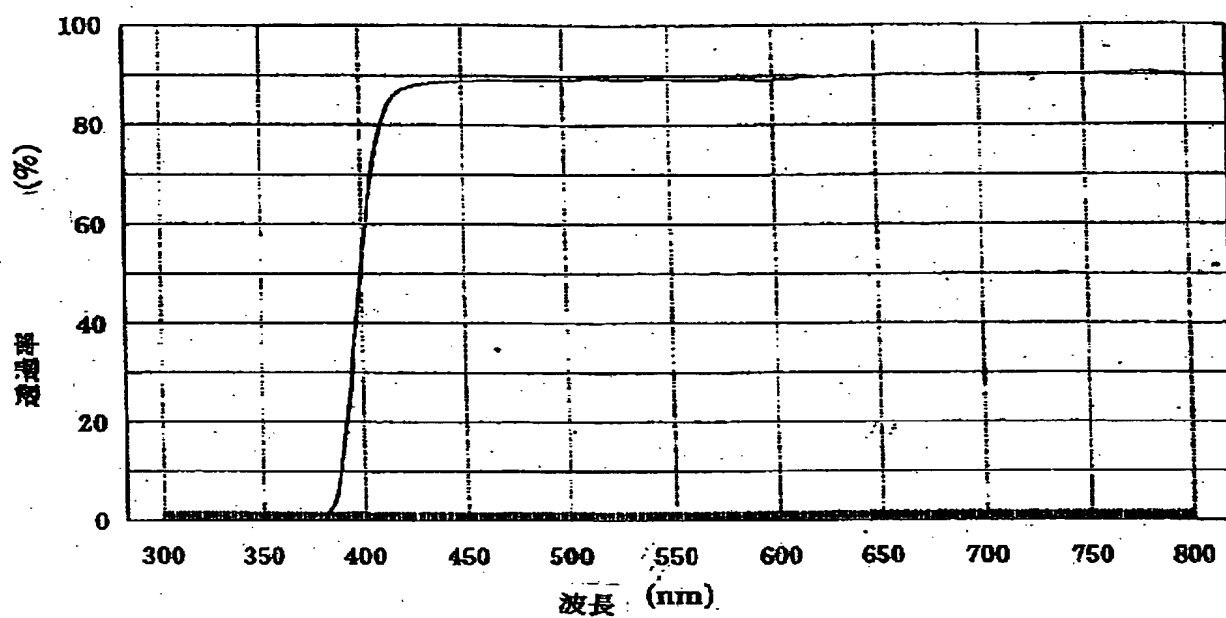
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DRAWINGS

[Drawing 1]



[Drawing 2]



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